

CHEMICAL CONTROL IN VEGETABLE PRODUCTION IN KADUNA STATE, NIGERIA

O.B. Adeniji

Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna,
Niger State, Nigeria

ABSTRACT

The study examines chemical use in vegetable production among farmers in Shika And Giwa Local Government area of Kaduna State with a view of highlighting the Side effects of these chemicals if not properly handled. Data were collected through interview schedule on 100 randomly selected vegetables farmers and analyzed using descriptive statistics. The findings revealed that majority of the farmers spray their crops with different chemicals to control insect and pest infestation. It was found that most of the farmers were oblivious of the harmful effect of pesticides/herbicides if not properly applied on crops, human and environment. It was found that some of the chemicals contain ingredients that is harmful to health .The study among other things recommended that extension services should intensify efforts in training farmers on handling of chemicals both during and after application. The use of integrated Pest Management Practices is advocated to enhance safety of environment and the populace

KEYWORDS: chemical control, vegetable production, pest infection, pest management, supporting services

INTRODUCTION

The importance of giving priority to agriculture have in recent years being recognized by policy makers in many developing countries realising that it is and will continue to be dominant sector of their economies , being the major employer of labour, source of food for fast growing population and raw materials for the growing agro-allied industries, savings and tax revenue to support the development of other sector of the economy and to earn more foreign exchange and/or save foreign exchange.

In Nigeria, the provision of subsidized farm inputs (such as fertilizer, improved planting material, agro-chemicals. etc) and supporting services (like tractor hire, extension services, guaranteed minimum prices for farm products etc) to farmers have been some of the publicized strategies of government at improving agricultural productivity and achieving rural development.

However, studies have shown that emphasis have been placed by successive government on boosting staple food production like yam, cassava, rice, maize, millet etc. with little emphasis on vegetables.

A crucial role of vegetable production especially, tomatoes, okra and *amaranthus* play in the economies of developing countries including Nigeria can be looked at in terms of rural employment, sources of raw materials for the industries and source of food for people (Tindal, 1996) In view of the importance of vegetables, various agencies engaged in the production., hence policies and programmes were embarked upon by government through provision of farm inputs such fertilizers, insecticides credit and extension services.

Vegetables are major component of Nigerian diet as in other part of the world. Hence, vegetables production is a vital area of agriculture. It plays a vital role in nutrition and most vegetables are valuable source of vitamins , mineral and dietary fibre and are low in fat and calories (Microsoft Encarta,2007) They are cheap and available. Apart from this, farmers socio-economic status have been positively affected through its production, in that it has helped in reduction of poverty in farm households.

There are no practical reasons why Nigeria should not be self sufficient in vegetable production to meet her local food demand. However, the incidence of insects and diseases pests poses serious threat to vegetable production and these two problems have been the major impediments to the goal of our realization of self-sufficiency in vegetable production.

Pests are insects, birds, rodents, monkeys, weeds, fungi, bacteria and fungi that feed on growing plants, injure them and kill them, and introduce diseases (Kolawole et al, 1979, Agrios, 2005). Chemicals that are used for pest control are known as pesticides. The word pesticides means “pest killer”.

A lot of extension activities have been on for many years on the need for farmers to adopt chemical pest control in vegetable production in Nigeria. Few of the many advantages of chemical pest control in tomato production includes among others : enhances plant vigour and healthy growth, lead to higher plant yields and consequently increased productivity, and leads to improved quality of the harvested yields (Agrios, 2005).

Table 1: Distribution of Respondents according to their socio-economic factors (n=100)

Variables	Frequency	Percentage
Age(in Years)		
Less than 30	20	20
30-40	40	40
41-50	25	35
51 above	5	5
Marital status		
Married	90	90
Single	10	10
Household size		
Less than 5	33	33
6-10	52	52
11 above	15	15
Farm size (in ha)		
0.1-5	92	92
5ha-above	8	8
Educational level		
Ouranic education	60	70
Primary	25	
Secondary school	15	
Farming experience		
1-5	30	30
6-10	60	60
11 above	10	10

However not all farmers are presently adopting this all-important agronomic practice. This paper examines the factors influencing the adoption of chemical pest control in vegetable (tomatoes, okra and *amaranthus*) crop in Shika and Giwa Local Government Area of Kaduna State, Nigeria . its impact on yield increase and the effect of chemicals on environment, human (consumers) and soil.

Economic importance of tomatoes, okra and amaranthus

Tomatoes(*lycopersicu esculentum*) which are grown both in home garden and commercial quantity. It can be eaten raw as fruit as salad or be processed into paste or puree which can be cooked to form accomplishment in meat savory dishes, stew or as a soup. (Smith, 2006) Fresh tomatoes make a significant contribution to human nutrition due to concentration and availability of nutrient. Tomatoes in Nigeria are commonly grown as a small scale or garden vegetable crop until recently. The establishment of River Basins Development Authority in 1980s triggered extensive under irrigation. Tomatoes can grow in a wide range of climatic conditions. It requires abundant sunshine and cool weather of 20°-27°C day temperature and 15°-21°C night temperature (Alamu, 1996). Okra (*hibiscus esculentus*, *abelmoschus esculentus*) is also a popular vegetable crop of major importance in the northern region .It

can be cooked, eaten raw, sliced and dried for future use and for oil extraction. It is presently being exported though in small quantities to some countries to meet needs of African residents in such countries.

Okra seed germinate in warm soil temperature above 16°C. A wide range of soil types gives economic yields but well drained soil cultivars are sensitive to excessive moisture. An average temperature of 20°-30°C is appropriate for growth, flowering and pod development. Okra is tolerant to wide variation in rainfall.

Amaranthus is a genus of the family Amaranthaceae. *Amaranthus* species are the most commonly grown leafy vegetable of the lowland tropics in Asia and Africa (Schipper 2000). Cultivation of the various *Amaranthus* species are acquiring increasing importance in Nigeria and other part of American continent, due to among other reasons its double potential as a vegetable and grain and also its vigorousness of growth (David, 1977). Vegetable *Amaranthus*, species are good sources of vitamins, minerals and flavors (Jonathan 1977). All African *Amaranthus* species are grown for their leaves. According to Becker and Saunders (1984) animals eat more of those with thorns (*A. spinosus*). *Amaranthus* species can grow up to 100cm high with colour ranging from green to purplish or pinkish. *Amaranthus* requires a fertile soil well supplied with organic matter for good productivity. According to Schippers (2000) there are no exact data on yields for the various African species of *Amaranthus*. Good productivity in *Amaranthus* however require optimum conditions which include judicious use of inputs such as fertilizers and pesticides..

Table 2. Distribution of respondents according to their awareness and adoption level of chemical control n=100

Chemical control	Aware		Adopted	
	Frequency	%	Frequency	%
Pest control	100	100	90	90
Weed control	90	90	30	30

This study examines chemical control in vegetables and addresses these objectives:

1. determine the socio-economic characteristics of farmers
2. determine the appropriateness of chemical control measure adopted by farmers
3. determine farmers awareness and attitude towards safety measures of chemical application

METHODOLOGY

The study was carried out in Shika and Giwa Local Government Areas of Kaduna State, Nigeria. The selection of the state and the Local Government was purposeful based on the existing knowledge of vegetable production potentials in the area. Preliminary field visits were made to identify the villages to be surveyed. Data were collected through interview schedule administered on 100 vegetable farmers. The farmers were randomly selected from the list provided by the Giwa Local Government Area agricultural department. . Data were analyzed using descriptive statistics.

Secondary data were sourced from Kaduna State Agricultural Development Authority and Horticultural Crops Research Programme of the Institute for Agricultural Research, Samaru, Ahmadu Bello University, Zaria Nigeria.

Shika and Giwa are situated in the northern Guinea Savannah, ecology with rainfall ranging from 700- 1000mm per annum. The rainfall is fairly distributed over a period of 3-5 months in the year, each has two sections. (i) The rainy season which start around May and ends in September ,and (ii)the dry season that last about seven months, that is from October to April .Agriculture constitute the economic activity of the people and the ecological factors enable farmers to cultivate variety of vegetables.

RESULTS AND DISCUSSION

Socio-economic characteristics of farmers in the study area

Table 1 shows the socio-economic characteristics of farmers that adopted Chemical pest/weed control in the study area. The variables examined are age of household head, family size, educational qualification of household head, and extension contact of the households. From the results, the mean age of farmers is 46 years, 70 % of the respondents belong to this category. This implies that there is predominance of youth and middle aged people among the farmers . The respondent's level of education ranged from non formal education to secondary education. The findings shows that over 60% of the respondents went to Quranic School, while 25% posses primary leaving certificate and 15 % secondary education. : A typical household was characterized by the presence of the male head,

the wife/wives, the children, and some members of the extended family. The average family size was five (5) members per household. The table also shows that 33% had a household size of less than 5, While 52% had household of ranging from 6-10, and 15% have more than 10 people in their household. The result shows that almost all the categories of household were participating in some aspect of vegetable production. The total farm size by 92% of respondents range from 0.5-1 hectare, only 8% have more than 2 hectares for vegetable production. The table also shows 60 % of the respondents have between 6-10 years experience in vegetables production. The table shows that majority of the respondent (90%) were married while 10 % were single. The indication is that married person predominate in vegetables production, this is not unconnected with the culture and religious belief of the study area which encourage early marriage

Table 2 shows the level of awareness and adoption of chemical pest/weed control by respondents. The result indicates that all respondents were aware while 90% of the farmers adopted the chemical control measures but 70 % of the farmers did not adopt the weed measures. Information on improved practices can be obtained from various sources.

Information on improved practices can be obtained by farmers from various sources Table 3 shows that the major source of information for farmers in the study area was extension services. It was observed that, 70% of the respondents received extension visit regularly, this is not unconnected with the proximity of the villages to IAR and the activities of KADP and NAERLS extension outfit. The findings is in conformity with Adeniji(2002) that extension agents are the most preferred source of farm information to farmers

Table 3. Respondents' information sources for vegetable production

Information sources	Frequency	Percentage
Extension Agents	70	70
Radio	20	20
Village heads/friends	10	10
Total	100	100

Constraints

With the introduction of innovations goes the responsibility of identification of user's constraints in the adoption and innovations and feedback to research. It is a critical factor that would help in demand driven technologies. Majority of the sampled farmers were faced with a number of problems which militated against their production during the period of survey. These problems are presented in table 4. The table shows that fertilizer scarcity was the most serious problem identified by 55% of the farmers. Next was lack of credit identified by 20%, of the farmers who experienced difficulties in obtaining loan for production. Capital is necessary for the purchase of equipment which is normally associated with improved technologies as recognized by Petrick (2004) De Castro and Teixeira (2006) While 10% of the farmers complained of storage facilities. Other constrain was the efficacy of the chemicals used for control of pest and weed. It was found that most of the chemical that were available in the market are fake so the farmers end up applying so much or so little as the case may be, thereby damaging the environment and the soil.

Table 4. Respondents' constraints in vegetables production n=100

Constraints	Frequency	Percentage	Rank
Fertilizer	55	55	1
Lack of credit	20	20	2
Storage facilities	10	10	3
Fake chemicals	15	15	4
Total	100	100	

Table 5 shows that majority of the farmers were not aware of safety measure in handling and using chemical either for pest or weed control. Most of the chemical can/or plastics containers were not properly disposed, while some even use the containers to fetch water for house hold use. Also not all the farmers have protective clothing like hand gloves, nose mask and booth which they are suppose to put on while spraying. Farmers attitude was measured on a 5 point scale from strongly agree to strongly disagree 5-1, and 1-5 for positive and negative statement. Results show that majority, about 70% attitude were unfavourable towards proper handling of chemicals.

According to Spore No 122 of April 2006, the level of exposure to pesticides and other chemicals poses danger to the health of the farmers. Pesticides containers are kept in open space where container deteriorate and leak their contents which contaminate soil, surface water and ground water. Many of the chemicals are so toxic that a few grammes could poison thousand of people or contaminate large area e.g. DDT Attrazine, Dieldrin, Diazinon, Captain and malathion. Knapsack sprayers are the commonly used equipment for pesticides application to crops in developing countries. Applicators usually spray the area head of themselves which means that they then walk into the spray mist and treated foliage exposing themselves to the pesticides.

Table 5. Respondents' awareness of safety measure

Safety Measure	Aware%	Not aware%	Total
Dispose container after use	30	70	100
Protective clothing	20	80	100
Nose/mouth mask	10	90	100

CONCLUSION.

Based on the finding of this study one can conclude that farmer's adoption of improved safe use of chemical is low and that major factor responsible for this may not be unconnected with the low level of education, inadequate finance and ignorance. Farmers should be encouraged to form cooperatives union so that information will easily be disseminated and access to genuine input will be made available to them

Safe and proper use of pesticides is essential. The product label is the best source for information concerning handling and application of the product. The warning danger or caution statement , depending on the product involved provide information on proper use and protective equipment needed , effect on wild life and environment, how to empty or dispose the containers after use and what to do when poisoned. Most of the respondent said they rarely read the leaflets hence, they are not aware of some of the dangers.

RECOMMENDATIONS

Following the problems identified in the study, the following recommendations are made:

There is the need for increase awareness for vegetables farmers on proper usage of chemical and all measures safeguarding the use of pesticides must be strictly adhered to and production recommendation followed..

There should be adequate supply of inputs as at when due and there is the need for financial assistance by government or NGOs through micro credit scheme to help farmers expand their production.

Farmers should be educated on proper disposal of residue and pesticides container to prevent environmental pollution and health hazard.

Most importantly emphasis should be placed on the adoption of integrated pest management techniques in the control of pest with the use of synthetic being the last resort.

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Received for Publication: 27/05/2008

Accepted for Publication: 14/07/2008

Corresponding Author:

E-mail: bolajiadeniji@yahoo.com